2020 Steam Electric Reconsideration Rule

Transition Briefing for Radhika Fox

February 9, 2021

Acronyms Used in This Briefing

- **BA** (bottom ash)
- **BAT** (best available technology economically achievable)
- **BMP** (best management practices)
- **BPT** (best practical control technology)
- **CCR** (coal combustion residual)
- **DOE** (Department of Energy)
- **EGU** (electric generating unit)
- **ELG** (effluent limitations guideline)
- **FGD** (flue gas desulfurization)
- **PSES** (pretreatment standards for existing sources)
- **TVA** (Tennessee Valley Authority)
- **VIP** (voluntary incentives program)

Overview

- Purpose
- History and Background
- Summary of What Changed
  - Flue gas desulfurization (FGD) wastewater
  - Bottom ash (BA) transport water
  - New subcategories
  - Implementation timing
- Questions to Ponder
- Litigation on the 2020 Rule
- Decisions Needed Today and Next Steps on Additional Briefings

Purpose

- The purpose of this briefing is to:
  - Provide history and background on the Steam Electric Effluent Limitations Guidelines (ELGs);
  - Tee up issues and considerations for future decision-making; and
  - Obtain approval to seek an abeyance in current litigation

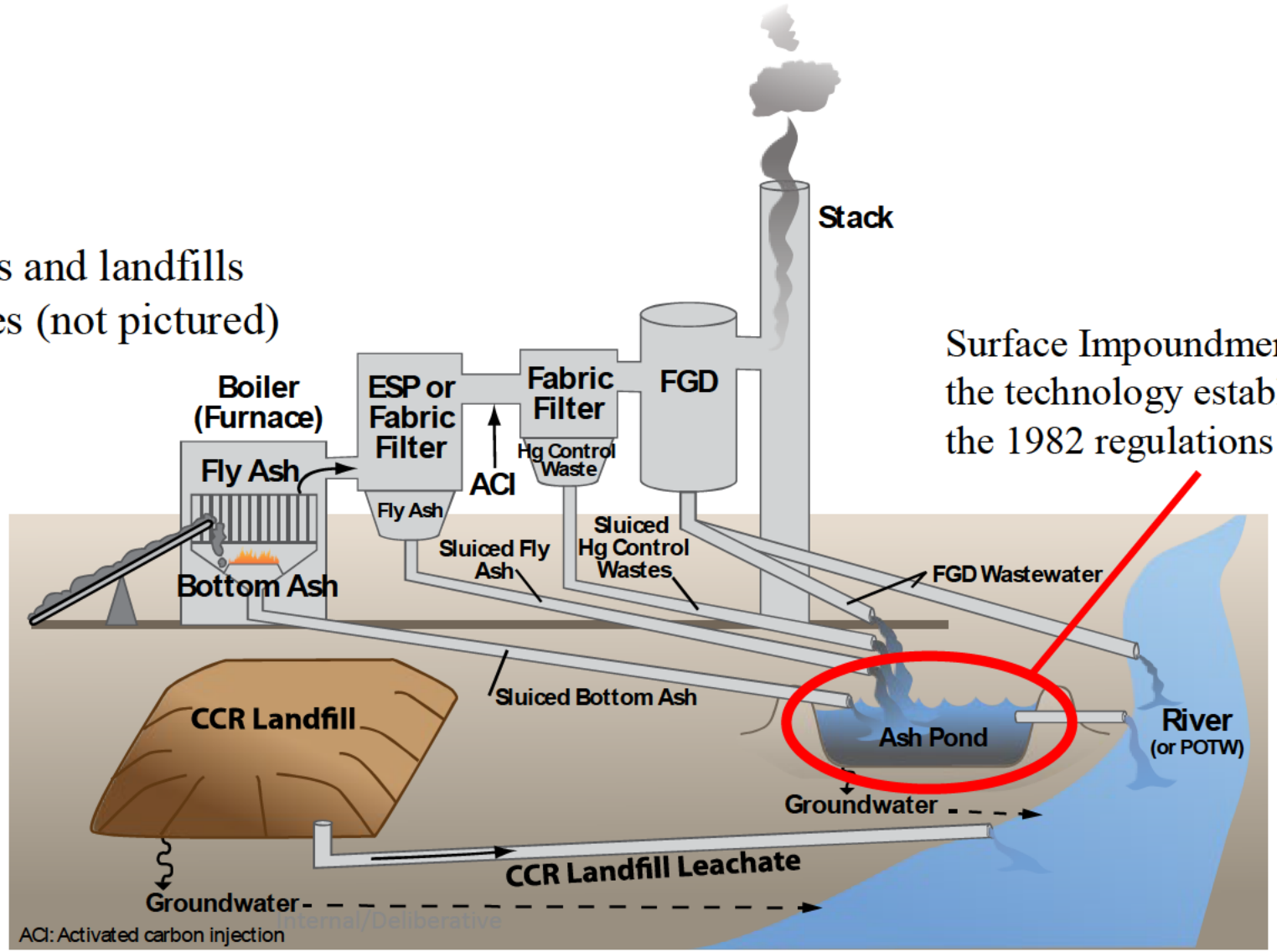
History and Background

- In 2015, EPA issued a final rule updating the 1982 effluent limitations guidelines and standards (ELGs) for steam electric power plants.
  - A steam electric power plant (plant) consists of one or more electric generating units (EGUs) which produce electricity primarily through the use of fossil or nuclear fuels to generate steam to turn a turbine
  - Coal-fired power plants, a subset of plants covered in the 2015 rule, generate several pollutant streams which are released into the air, water, and land
  - These coal-derived waste streams make up the majority of those regulated in the 2015 rule (see figure on next slide)

History and Background

- FGD wastewater
- Fly ash transport water
- BA transport water
- Mercury (Hg) control waste
- Leachate from ash/FGD ponds and landfills
- Gasification process discharges (not pictured)

Surface Impoundments were the technology established in the 1982 regulations



Notes:

- Also addressed legacy wastewaters (any of the above wastewaters generated before the implementation dates for the new, more stringent BAT)
- Companion coal combustion residual (CCR) rule regulates solid waste disposal

History and Background

- The 2015 rule was subject to multiple legal challenges (7 petitions for review from environmental, industry and drinking water groups) and two administrative petitions for reconsideration.
- In 2018, EPA announced it would reconsider the Steam Electric ELGs through a new rulemaking* with respect to:
  - Flue gas desulfurization (FGD) wastewater and
  - Bottom ash (BA) transport water
- The final reconsideration rule, signed on August 31, 2020, contains revised ELGs for these two waste streams.

*EPA did not reconsider limits for fly ash transport water or certain other wastestreams.

Summary of the 2020 Rule: What Changed?

- Revises the technology basis, limitations, and compliance dates for
  - FGD wastewater (both generally applicable limitations and the more stringent voluntary incentives program [VIP[1]] limitations); and
  - BA transport water.
- Creates new subcategories (point source discharges subject to differentiated treatment) with less stringent limitations and compliance dates for
  - High FGD flow power plants,
  - Low-utilization electric generating units (i.e., "peakers"), and
  - Electric generating units permanently ceasing coal combustion by 2028 (i.e., retiring or converting to a non-coal fuel)

[1] The VIP allows facilities additional time in exchange for meeting more stringent limitations through the adoption of more advanced treatment technologies

Summary of the 2020 Rule: FGD Limits

Pollutant or pollutant property	Year	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed	Change
Arsenic, total (ug/L)	2015	11	8	Negligible
	2020	18	8	
Mercury, total (ng/L)	2015	788	356	More Stringent
	2020	103	34	
Selenium, total (ug/L)	2015	23	12	Less Stringent
	2020	70	29	
Nitrate/nitrite as N (mg/L)	2015	17.0	4.4	More Stringent
	2020	4	3	

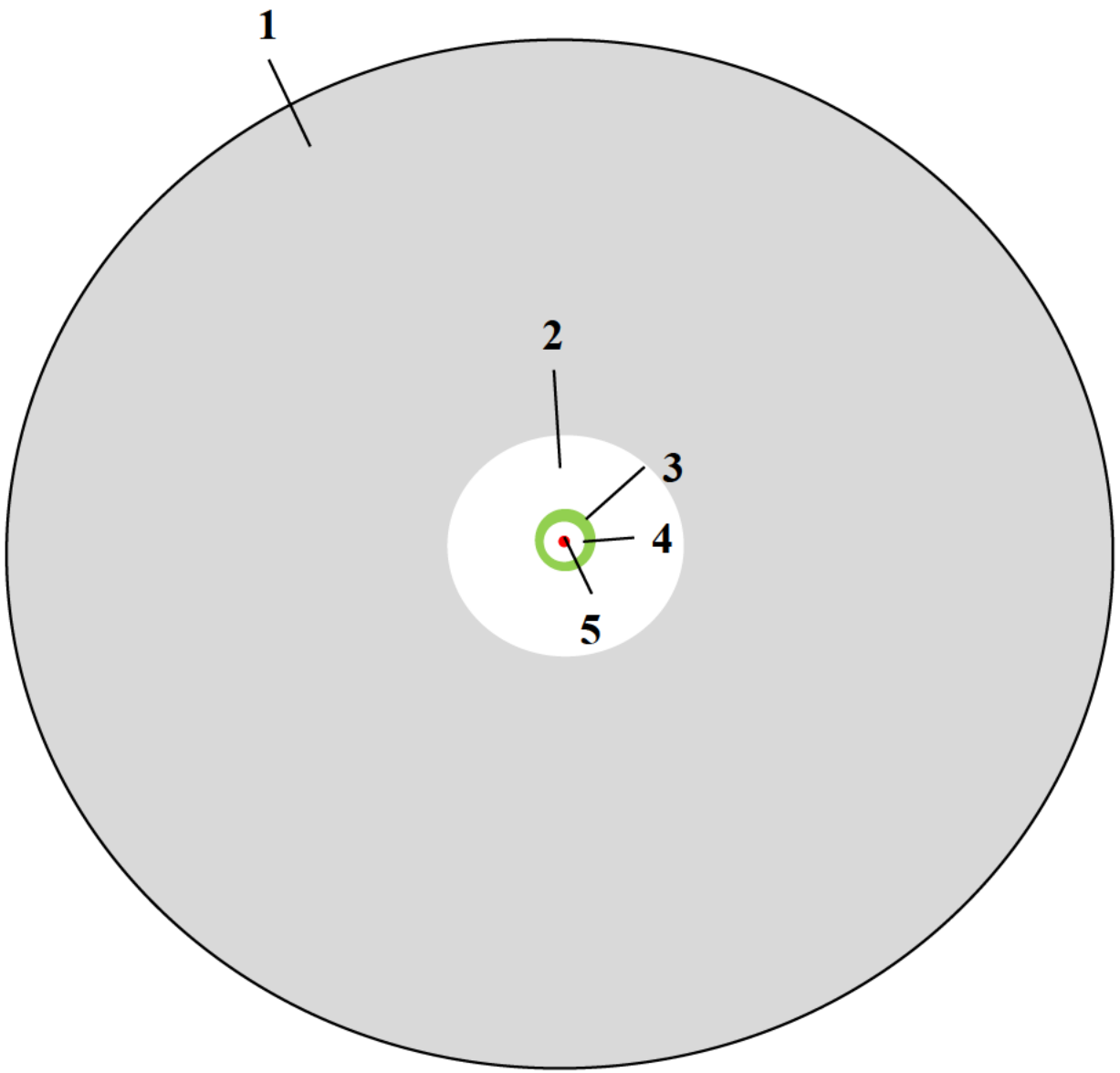
Summary of the 2020 Rule: FGD Voluntary Incentive Program (VIP) Limits

Pollutant or pollutant property	Year	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed	Change
Arsenic, total (ug/L)	2015	4	N/A	Negligible
	2020	5	N/A	
Mercury, total (ng/L)	2015	1.8	1.3	Less Stringent
	2020	23	10	
Selenium, total (ug/L)	2015	453	227	More Stringent
	2020	10	N/A	
Nitrate/nitrite as N (mg/L)	2020	2.0	1.2	New Limit
Bromide (mg/L)	2020	0.2	N/A	New Limit
TDS (mg/L)	2015	38	22	Less Stringent
	2020	306	149	

Summary of the Final Rules: BA Limits

- 2015 Rule BAT/PSES: Zero Discharge
  - Compliance using dry system (does not generate BA transport water)
    or
  - Compliance using a wet system (must achieve 100% recycle)
- 2020 Rule BAT/PSES: Site-Specific Purge
  - May still comply using a dry system that does not generate BA transport water
    or
  - If compliance is using a wet system, may request a site-specific purge determination from the permitting authority

Summary of the 2020 Rule: BA Limits



1) **<u>Current Discharges</u>**: 100% of surface impoundment (SI) influent

2) **<u>Rolling 30-Day Average Cap</u>**: 10% of primary active wetted system volume (includes volumes of primary tanks, pipes, etc. but no SI volume) §423.11(aa)-(bb) and §423.13(k)(2)(i)(B) or §423.16(g)(2)(i)(B)

3) **<u>Must Be Allowable Purges</u>**: four allowable purges *See* §423.13(k)(2)(i)(A)(1)-(4) or §423.16(g)(2)(i)(A)(1)-(4)

4) **<u>Must Be Necessary Purges</u>**: "cannot be managed within the system" §423.19(c)(3)(G)

5) **<u>Further Purge Treatment</u>**: permitting authorities establish limits using Best Professional Judgement (BPJ) §423.11(cc)

Summary of the 2020 Rule: Subcategories

- EPA created three new subcategories which were all given less stringent limitations
- These new subcategories were not estimated to impact a large portion of the steam electric industry (estimated counts below)

Grouping or Subcategory	# of Plants*	# of EGUs
All Coal-Fired Steam Electric	**218**	**427**
→Subset with FGD Wastewater Discharges[1]	56	135
→Subset with BA Transport Water Discharges[1]	94	214
High FGD Flow Subcategory	1	2
Low Utilization EGUs Subcategory	4[2]	6
Permanent Cessation of Coal Combustion EGUs Subcategory	12[2]	23

[1] Plants and EGUs with FGD and BA discharges overlap, and the 2020 rule only impacts 108 plants total

[2] Since the low utilization and ceasing combustion of coal subcategories impact individual EGUs, not all EGUs at a plant qualify

Summary of the 2020 Rule: Subcategories

- High FGD Flow Plants (FGD Wastewater ONLY)
  - Plant does not have to meet selenium or nitrogen limits (technology basis is chemical precipitation, only)
  - EPA data indicate that only one plant (TVA Cumberland) qualifies for this subcategory

Pollutant or pollutant property	Year	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed	Change
Arsenic, total (ug/L)	2015	11	8	None
	2020	11	8	
Mercury, total (ng/L)	2015	788	356	None
	2020	788	356	
Selenium, total (ug/L)	2015	23	12	Limit Removed
Nitrate/nitrite as N (mg/L)	2015	17.0	4.4	Limit Removed

Summary of the 2020 Rule: Subcategories

- Low utilization EGUs (FGD Wastewater)
  - Like limitations for high FGD flow plants, the plant does not have to meet limitations for selenium and nitrogen
  - FGD systems are designed for an entire plant, so plants with both high and low utilization EGUs (if any) are likely to meet the standard limitations even for any low utilization EGUs

Pollutant or pollutant property	Year	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed	Change
Arsenic, total (ug/L)	2015	11	8	None
	2020	11	8	
Mercury, total (ng/L)	2015	788	356	None
	2020	788	356	
Selenium, total (ug/L)	2015	23	12	Limit Removed
Nitrate/nitrite as N (mg/L)	2015	17.0	4.4	Limit Removed

Summary of the 2020 Rule: Subcategories

- Low utilization EGUs (BA Transport Water)
  - Unlike limitations for non-subcategorized EGUs, BAT limitations for this subcategory are set equal to BPT limitations
  - In addition, facilities must develop and implement a best management practices (BMP) plan which maximizes wastewater recycling to the extent feasible
  - The BMP plan does not require purges to be below 10%; however, where a low utilization EGU has an existing high recycle rate system the BMP plan will effectively limit purges to the same range as the rest of the industry.

Summary of the Final Rule: Subcategories

- EGUs Permanently Ceasing Coal Combustion (FGD Wastewater)
  - Unlike the rest of the industry or subcategories, BAT limitations for this subcategory are permanently set equal to BPT and therefore do not regulate mercury, arsenic, selenium, or nitrate/nitrite
  - Three of five plants with EGUs qualifying for this subcategory and discharging FGD wastewater already operate advanced FGD wastewater treatment systems (all three operate chemical precipitation while one also operates biological treatment)

Pollutant or pollutant property	Year	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed	Change
Arsenic, total (ug/L)	2015	11	8	Limit Removed
Mercury, total (ng/L)	2015	788	356	Limit Removed
Selenium, total (ug/L)	2015	23	12	Limit Removed
Nitrate/nitrite as N (mg/L)	2015	17.0	4.4	Limit Removed

Summary of the 2020 Rule: Subcategories

- EGUs permanently ceasing combustion of coal by 2028 (BA Transport Water)
  - Like the previous subcategory, BAT limitations for this subcategory are set equal to BPT limitations
  - Unlike the previous subcategory, no BMP plan is required for this subcategory
  - Four of nine plants with EGUs that EPA projects qualify for this subcategory and discharge BA transport water already operate high recycle rate systems

Summary of the 2020 Rule: Timing

- Compliance deadline is "as soon as possible" and "no later than" dates specified in the final rule.
  - *Earliest date*: October 13, 2021
  - *No later than date*: Wastestream/subcategory dependent (see next slide)

- Permitting authorities must consider the following site-relevant factors:[1, 2]
  - Time necessary to expeditiously plan, design, procure, and install equipment
  - Changes being made or planned in response to other EPA air and waste regulations (e.g., CCR Part A final rule)
  - An initial commissioning period for FGD wastewater
  - Other factors as appropriate

[1] The 2020 rule does not revise the specified factors that the NPDES permitting authority must consider in determining the as soon as possible date under the 2015 rule. *See* §423.11(t).

[2] Applicability date for VIP limitations are not determined through application of §423.11(t) but is instead simply December 31, 2028.

Summary of the Final Rule: Timing

- For Pretreatment Standards for Existing Sources (PSES), no later than October 13, 2023.
- For direct discharges, no later than:

Limits	FGD Wastewater	BA Transport Water
Generally Applicable Limitations	December 31, 2025	December 31, 2025
High Flow Subcategory	December 31, 2023	N/A
Low utilization Subcategory	December 31, 2023	Discharge limits are immediately applicable; BMP plans must be completed by December 31, 2023
Ceasing coal combustion Subcategory	Immediately Applicable	Immediately Applicable
VIP	December 31, 2028	N/A

Note: The 2015 rule "no later than" dates for all wastewaters was November 1, 2018 for indirect dischargers and December 31, 2023 for direct dischargers

Other Questions to Ponder…

- (b) (5)

Other Questions to Ponder (cont'd)…

- (b) (5)

Other Questions to Ponder (cont'd)…

- (b) (5)

Litigation on the 2020 Rule

- 2 petitions for review filed by Appalachian Voices, Clean Water Action et al. were consolidated in the 4th Cir. Ct. of Appeals. *Appalachian Voices v. EPA*, No. 20-2187.
- Case stayed until Feb. 24, 2021, which is the deadline for filing petitions for review.
- We can expect petitioners to raise some of the following issues in the litigation, which were the focus of their public comments:
  - (b) (5)

Decisions Needed and Next Steps

- **Decision Needed Today**: Approval to seek an abeyance in the Fourth Circuit before February 24
  - Lay of the land for current litigation (OGC)
  - (b) (5)
  - (b) (5)
- **Future Decision**: Substantive decision on potential reconsideration
- **Next Steps**:
  - (b) (5)

Appendix Contents

- Illustrative timeline of 2020 rule implementation (slide 27)
- Regulatory options considered in the 2015 final rulemaking (slide 28) and in the 2020 final rulemaking (slide 29)
- Table of EGUs retiring or repowering between January 1, 2024 and December 31, 2028 (slides 30-31)

Preliminary Decisions, Some May Change

Final Decisions, Implementation Underway

Ongoing: Company reads the final regulation, conducts scoping analysis and regular integrated resource plan analyses, pilot tests equipment, begins raising capital, seeks bids, may transfer under §423.13(o)

10/13/2021: If a company believes it will participate in a subcategory or VIP, the company files a Notice of Planned Participation (NOPP)* with its permitting authority or control authority

12/31/2023: High FGD flow plants and LUEGUs must meet applicable requirements; no further transfer into LUEGU subcategory under §423.13(o)

12/31/2025: Implementation of generally applicable requirements; no further transfer between limitations is permitted under §423.13(o)

12/31/2028: Implementation of VIP limits; final date to retire/repower

*Ongoing for those filing a NOPP:

(1) File annual progress reports/certifications with the permitting authority or control authority.

(2) File a notice of material delay, if necessary. **§423.19(j)**

2015 Rule Regulatory Options

Wastestreams	Technology Basis for the BAT Regulatory Options					
	A	B	C	D	E	F
FGD Wastewater	Chemical Precipitation	Chemical Precipitation + Biological Treatment	Chemical Precipitation + Biological Treatment	Chemical Precipitation + Biological Treatment	Chemical Precipitation + Biological Treatment	Evaporation
Fly Ash Transport Water	Dry Handling	Dry Handling	Dry handling	Dry handling	Dry handling	Dry handling
Bottom Ash Transport Water	Impoundment (Equal to BPT)	Impoundment (Equal to BPT)	Dry handling/Closed loop (for units >400 MW); Impoundment (Equal to BPT)(for units ≤400 MW)	Dry handling/ Closed loop	Dry handling/ Closed loop	Dry handling/ Closed loop
FGMC Wastewater	Dry handling	Dry handling	Dry handling	Dry handling	Dry handling	Dry handling
Gasification Wastewater	Evaporation	Evaporation	Evaporation	Evaporation	Evaporation	Evaporation
Combustion Residual Leachate	Impoundment (Equal to BPT)	Impoundment (Equal to BPT)	Impoundment (Equal to BPT)	Impoundment (Equal to BPT)	Chemical Precipitation	Chemical Precipitation
Non-Chemical Metal Cleaning Wastes	[Reserved]	[Reserved]	[Reserved]	[Reserved]	[Reserved]	[Reserved]

- Option D was selected as the basis for the BAT effluent limitations.
- For all units 50MW and smaller (and for oil-fired units of any size), BAT limits for all wastestreams are set equal to the 1982 BPT regulation, based on settling ponds.
- For legacy wastes, BAT limits for all wastestreams are set equal to the 1982 BPT regulation, based on settling ponds.
- Created a voluntary incentives program (VIP) for FGD wastewater based on evaporation.

Table ES-1: Regulatory Options

Wastestream	Subcategory	Technology Basis for BAT/PSES Regulatory Options [Compliance Timing][b]				
		2015 Rule (Baseline)	Option D[c]	Option A	Option B	Option C
FGD Wastewater	NA (default)[a]	Chemical Precipitation + HRTR Biological Treatment [2021-2023]	Chemical Precipitation [2021-2023]	Chemical Precipitation + LRTR Biological Treatment [2021-2025]	Chemical Precipitation + LRTR Biological Treatment [2021-2025]	Membrane Filtration [2024-2028]
	High FGD Flow Facilities: Plant-level scrubber purge flow >4 MGD	NS	NS	Chemical Precipitation [2021-2023]	NS	NS
	Low Utilization Boilers: All units have 24-month average utilization < 10%	NS	NS	Chemical Precipitation [2021-2023]	NS	NS
	Generating units ceasing combustion of coal by December 31, 2028	NS	NS[d]	Surface Impoundment	NS	NS
FGD Wastewater Voluntary Incentives Program (Direct Dischargers Only)		Chemical Precipitation + Evaporation [2023]	Membrane Filtration [2028]	Membrane Filtration [2028]	Membrane Filtration [2028]	NA
Bottom Ash Transport Water	NA (default)[a]	Dry Handling / Closed loop [2021-2023]	High Recycle Rate Systems [2021-2023]	High Recycle Rate Systems [2021-2025]	High Recycle Rate Systems [2021-2025]	High Recycle Rate Systems [2021-2025]
	Low Utilization Boilers: All units have 24-month average utilization < 10%	NS	NS	Surface Impoundment + BMP Plan [2021-2023]	NS	NS
	Generating units ceasing combustion of coal by December 31, 2028	NS	NS[d]	Surface Impoundment	NS	NS

Abbreviations: BMP = Best Management Practice; HRTR = High Hydraulic Residence Time; LRTR = Low Hydraulic Residence Time; NS = Not subcategorized; NA = Not applicable

a. The table above does not present existing subcategories included in the 2015 rule as EPA did not reopen the existing subcategorization of oil-fired units or units with a nameplate capacity of 50 MW or less.

b. The compliance timing is 2021-2023 for indirect dischargers across all options.

c. Option D corresponds to proposed Option 1.

d. Option 1 as proposed used surface Impoundment as the technology basis for electric generating units ceasing combustion of coal by December 31, 2028. In its 2019 analysis, however, EPA did not specifically subcategorize these boilers but instead omitted these boilers from the analysis (*see* U.S. EPA, 2019a).

Table 1 – Costs for EGUs (Absent Subcategorization) with Announced Dates for Retiring or Converting Fuels of 2024-2028

Count	Power plant	Unit	Retire/ Repower Date	Capital Costs	O&M Costs	Annualized Over Years Remaining	20-yr $/MWh	Adjusted $/MWh
1	Rockport	SE Unit-1	2028	$0	$0	$0	$0.00	$0.00
2	Allen Steam Station	SE Unit-4	2028	$248,867	$17,354	$59,031	$0.20	$0.28
3	Allen Steam Station	SE Unit-5	2028	$248,867	$18,593	$60,271	$0.12	$0.18
4	Allen S King Generating Plant	SE Unit-1	2028	$20,197,966	$2,175,463	$5,557,971	$1.45	$1.98
5	PPL Brunner Island	SE Unit-1	2028	$14,478,280	$1,304,569	$3,729,215	$4.73	$6.61
6	PPL Brunner Island	SE Unit-2	2028	$16,353,489	$1,315,087	$4,053,769	$4.05	$5.74
7	PPL Brunner Island	SE Unit-3	2028	$28,485,881	$1,813,653	$6,584,119	$3.04	$4.44
8	NIPSCO Michigan City Generating Station	SE Unit-1	2028	$1,045,242	$0	$175,044	$0.06	$0.11
9	Jim Bridger Power Plant	SE Unit-2	2028	$0	$0	$0	$0.00	$0.00
10	McMeekin Station	SE Unit-1	2028	$0	$0	$0	$0.00	$0.00
11	McMeekin Station	SE Unit-2	2028	$0	$0	$0	$0.00	$0.00
12	Colstrip	SE Unit-3	2027	$0	$0	$0	$0.00	$0.00
13	Colstrip	SE Unit-4	2027	$0	$0	$0	$0.00	$0.00
14	White Bluff Plant	SE Unit-1	2027	$26,522	$33	$4,954	$0.00	$0.00
15	White Bluff Plant	SE Unit-2	2027	$26,522	$35	$4,956	$0.00	$0.00
16	Dave Johnston Plant	SE Unit-1	2027	$6,690,598	$1,082,956	$2,324,418	$2.76	$3.75
17	Dave Johnston Plant	SE Unit-2	2027	$6,690,598	$1,094,661	$2,336,123	$2.46	$3.33
18	Dave Johnston Plant	SE Unit-3	2027	$9,997,304	$1,395,806	$3,250,838	$1.70	$2.37
19	Dave Johnston Plant	SE Unit-4	2027	$0	$0	$0	$0.00	$0.00
20	Intermountain Power Project	SE Unit-1	2027	$0	$0	$0	$0.00	$0.00
21	Intermountain Power Project	SE Unit-2	2027	$0	$0	$0	$0.00	$0.00
22	Winyah Generating Station	SE Unit-1	2027	$12,574,491	$610,461	$2,943,699	$3.71	$6.08
23	Winyah Generating Station	SE Unit-2	2027	$14,146,474	$690,087	$3,315,011	$6.24	$10.21
24	Craig Station	SE Unit-2	2026	$0	$0	$0	$0.00	$0.00
25	Northeastern Power Station	SE Unit-3	2026	$0	$0	$0	$0.00	$0.00
26	Dolet Hills Power Station	SE Unit-1	2026	$23,407,363	$2,723,514	$7,634,280	$2.85	$4.41
27	Interstate Power and Light - Prairie Creek Generating Station	SE Unit-1	2025	$0	$0	$0	$0.00	$0.00
28	Interstate Power and Light - Prairie Creek Generating Station	SE Unit-2	2025	$0	$0	$0	$0.00	$0.00
29	Interstate Power and Light - Prairie Creek Generating Station	SE Unit-3	2025	$0	$0	$0	$0.00	$0.00
30	Big Cajun 2	SE Unit-1	2025	$0	$0	$0	$0.00	$0.00
31	Sherburne County Generating Plant	SE Unit-1	2025	$0	$0	$0	$0.00	$0.00

Count	Power plant	Unit	Retire/ Repower Date	Capital Costs	O&M Costs	Annualized Over Years Remaining	20-yr $/MWh	Adjusted $/MWh
32	TransAlta Centralia Generation, LLC	SE Unit-2	2025	$12,191,588	$536,223	$3,509,638	$0.57	$1.18
33	Cholla Power Plant	SE Unit-1	2025	$0	$0	$0	$0.00	$0.00
34	Cholla Power Plant	SE Unit-3	2025	$0	$0	$0	$0.00	$0.00
35	North Valmy Generating Station	SE Unit-2	2025	$0	$0	$0	$0.00	$0.00
36	Naughton Power Plant	SE Unit-1	2025	$7,985,008	$1,663,947	$3,611,416	$2.07	$3.10
37	Naughton Power Plant	SE Unit-2	2025	$9,428,831	$1,795,440	$4,095,044	$1.73	$2.64
38	Comanche Station	SE Unit-2	2025	$0	$0	$0	$0.00	$0.00
39	Erickson Station	SE Unit-1	2025	$0	$0	$0	$0.00	$0.00
40	Allen Steam Station	SE Unit-1	2024	$149,320	$11,156	$55,239	$0.31	$0.68
41	Allen Steam Station	SE Unit-2	2024	$149,320	$11,156	$55,239	$0.30	$0.65
42	Allen Steam Station	SE Unit-3	2024	$248,867	$17,354	$90,826	$0.22	$0.48
43	C D McIntosh Jr. Power Plant	SE Unit-3	2024	$5,694,697	$349,820	$2,031,055	$0.59	$1.34
44	JT Deely Steam Electric Station	SE Unit-1	2024	$0	$0	$0	$0.00	$0.00
45	JT Deely Steam Electric Station	SE Unit-2	2024	$0	$0	$0	$0.00	$0.00
46	Will County Station	SE Unit-4	2024	$18,938,308	$1,902,190	$7,493,311	$5.16	$10.47